

Remarks

Entry of the foregoing amendments and reconsideration of this application is requested. By this amendment, the specification and claims 1, 3, 4, 6, 8, 10, 11, 16, 17, 20, 24, 25, 30 and 37 have been amended to more specifically set forth the invention. Claims 1-37 remain pending in the application.

Claim Rejections – 35 U.S.C. § 112

The Examiner has rejected claims 1-37 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner states that the claim(s) contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The Examiner states that the term “directly” in the current claims is not found in the specification as originally filed and that there is no definition for what “directly” covers with respect to patterning the layer, and as such, the prior art relied upon by the Examiner in the previous office action is still applicable. The Examiner suggests that a reasonable definition, with appropriate basis in the original specification, needs to be inserted in the current specification to provide guidance to one of skill in the art, and potentially overcome the prior art rejections as well.

In response, the applicants have submitted herewith amendments to the specification and claims to further clarify the applicant's inventive process as

including a direct patterning layer and the step of directly patterning this layer. More specifically, the applicant's have amended the specification to further define and thus clarify the contrasting methods of direct patterning and indirect patterning. The applicant asserts that there is sufficient basis originally presented within the specification to provide for the proposed amendments. No new matter was added by these amendments.

Claim Rejections - 35 U.S.C. § 102(e)

The Examiner has rejected claims 1-36 under 35 U.S.C. §102(e) as being anticipated by Resnick et al., U.S. Patent No. 6,517,977, hereinafter referred to as Resnick and Mancini et al., U.S. Patent No. 6,387,787, hereinafter referred to as Mancini. The Examiner states that since the scope of the claims in doubt as to the definition of "directly", the prior art rejection is being maintained. Furthermore, the Examiner asserts that a review of the prior art shows that the patterned layers are directly patterned, even if they are over-coated with a mask. When the etching is performed this is a type of direct patterning within the unclear scope of the applicants' current claims.

The applicant respectfully disagrees with these rejections in light of the amendments presented herein and asserts that the applicant's claims as amended herein do not read on the disclosures of Resnick and Mancini. The applicant asserts that Resnick and Mancini fail to disclose the inclusion of an irradiation sensitive and directly patternable patterning layer as is now defined within the

specification and claimed by the applicants. The applicants have amended the specification and claims 1, 3, 4, 6, 8, 10, 11, 16, 17, 20, 24, 25, 30, and 37 to include an irradiation sensitive and directly patternable patterning layer

As described in the amended specification paragraph which is substituted for the originally filed paragraph found on page 8, line 20 through page 9, line 10, the applicant has disclosed that, This conventional template patterning methodology is distinctly different from the current invention. Conventional indirect patterning involves the use of a radiation sensitive photoresist material that is used as a masking layer to apply a defined removal of an underlying layer using an etch process. Here, in the indirect case, a photoresist material acts as an intermediate masking layer, and is useful only for its patterning and masking qualities, but is not useful as a final relief layer. The conventional photoresist, not having the mechanical properties to be useful as a relief layer, is removed once the pattern formed in it has been transferred to the underlying layer. In this manner, any appropriate material that is etchable can be used as the underlayer, being transformed into the relief layer by means of this resist masking, etch and resist removal process. In contrast, disclosed herein is the use of direct patterning which includes a resist, or patterning, layer that once patterned is not used as an intermediate layer to effect pattern transfer to a second layer. Rather the patterning layer, which is itself radiation sensitive, actually becomes the final template relief structure subsequent to patterning by irradiation and development. This is made possible by judicious use of unique materials which combine the patternable characteristics of a photoresist, with the robust mechanical properties required of a

template relief layer. These properties include high adhesive strength to the substrate, high modulus, high shear strength, and good thermal stability. Materials such as hydrogen silsesquioxane (HSQ) are patternable to a very high resolution and, once cured, form a very stable silicon oxide suitable as a template relief structure for imprinting. Materials with similar characteristics may be substituted for this application for HSQ. However, it should be noted that any such materials which are both irradiation sensitive and patternable, and possess adequate physical properties to behave as a template relief layer are unique and are the heart of this invention. “

The applicant has amended the claims presented herein to more accurately claim the inclusion of this irradiation sensitive and directly patternable patterning layer that forms the final relief structure. The applicants lithographic template and method of forming the lithographic template do not require the inclusion of a separate photoresist layer, as disclosed in Resnick and Mancini, and as typically found in standard indirect patterning, to achieve patterning of the irradiation sensitive and directly patternable patterning layer. The irradiation sensitive and directly patternable patterning layer as disclosed by the applicant is directly imageable without the need for a separate photoresist/masking layer, and once directly patterned, become the final template relief structure.

Resnick and Mancini both describe the inclusion of a separate photoresist layer that is formed on an uppermost surface of a patterning layer, that is necessary to achieve fabrication of the final template relief structure. More specifically,

Resnick and Mancini disclose the creation of patterning layer using standard lithographic methods, namely deposition of a layer, which once patterned is a patterning layer, and the application of a photoresist layer on an uppermost surface of the patterning layer to effect patterning of the patterning layer, also known as indirect patterning. Fabrication of the final template relief structure requires the patterning of the photoresist layer using standard lithographic methodology, including the photoresist material layer, which is subsequently utilized as a mask to achieve the actual patterning (etch) of the patterning layer. The photoresist layer is developed utilizing a standard developer, that is applied directly to the photoresist layer (not the patterning layer), as is well known in the art and the photoresist layer (masking layer) is completely removed subsequent to patterning (etching) of the patterning layer. Thus, in the disclosures of Resnick and Mancini, the photoresist layer is used only as a temporary masking structure and has no permanent usefulness in the final template relief structure and so is removed prior to using the template within a device. In addition, the material properties of the photoresist layer as disclosed in Resnick and Mancini are typically such that they would not perform well as anything other than a temporary masking layer.

In contrast, the applicant's lithographic template and method of forming the lithographic template involves a unique classification of materials that combine the direct patternability of a photoresist and the durable mechanical properties of a patterning layer. The irradiation sensitive and directly patternable patterning layer once having a developer applied directly thereto following irradiation, behaves like a photoresist due to the uniqueness of the material being radiation sensitive and

having the ability to be selectively removed (patterned). This use of a specific material having these characteristics provides for the elimination of an interim photoresist processing step combined with an etch step. The patterning layer of Resnick and Mancini is not responsive to radiation, only the photoresist layer is. The applicants accordingly state that their irradiation sensitive and directly patternable patterning layer is responsive to radiation, and as a result forms the patterned imageable relief layer having a relief structure without the need for an interim masking layer.

To anticipate a claim for a patent, a single prior source must contain all its essential elements. Each limitation of a claim must be found in a single reference, practice, or device. In that the Resnick and Mancini disclosures fail to claim the inclusion of a irradiation sensitive and directly patternable patterning layer and the direct patterning of the directly patternable patterning layer, there is clearly no anticipation by Resnick or Mancini. This exclusion of claimed elements from a prior art reference is enough to negate anticipation by this reference.

Therefore, in light of these remarks, the applicants assert that the amended claims presently in the application do not read on Resnick or Mancini. Accordingly, the applicant believes that independent claims 1, 17, 30 and 37 are in a condition for allowance. The applicant also believes that depending claims 2-16, 18-29, and 31-36 depending therefrom, respectively, are also in a condition for allowance in that they must contain each and every element of the claim from which they depend. In

light of the above remarks, the applicant believes the 35 U.S.C. §102 rejection has been overcome. Notice to that effect is respectfully requested.

No amendment made herein was related to the statutory requirements of patentability unless expressly states; rather any amendment not so identified may be considered as directed *inter alia* to clarification of the structure and/or function of the invention and Applicants' best mode for practicing the same. Additionally, no amendment made herein was presented for the purpose of narrowing the scope of any claim, unless Applicant has argued that such amendment was made to distinguish over a particular reference or combination of references. Furthermore, no election to pursue a particular line of argument was made herein at the expense of precluding or otherwise impeding Applicants from raising alternative lines of argument later during prosecution. Applicants' failure to affirmatively raise specific arguments is not intended to be construed as an admission to any particular point raised by the Examiner.

The Applicant believes that the subject application, is in condition for allowance. Such action is earnestly solicited by the Applicant. In the event that the Examiner deems the present application non-allowable, it is requested that the Examiner telephone the Applicant's attorney or agent at the number indicated below so that the prosecution of the present case may be advanced by the clarification of any continuing rejection.

SUMMARY: Reconsideration is respectfully requested. In view of the foregoing amendments and remarks it is believed that the application, including claims 1-37, is now in condition for allowance. Notice to that effect is respectfully requested.

Authorization is hereby given to charge any fees necessitated by actions taken herein, including any extension of time fees, to Deposit Account 502117.

Respectfully submitted,



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